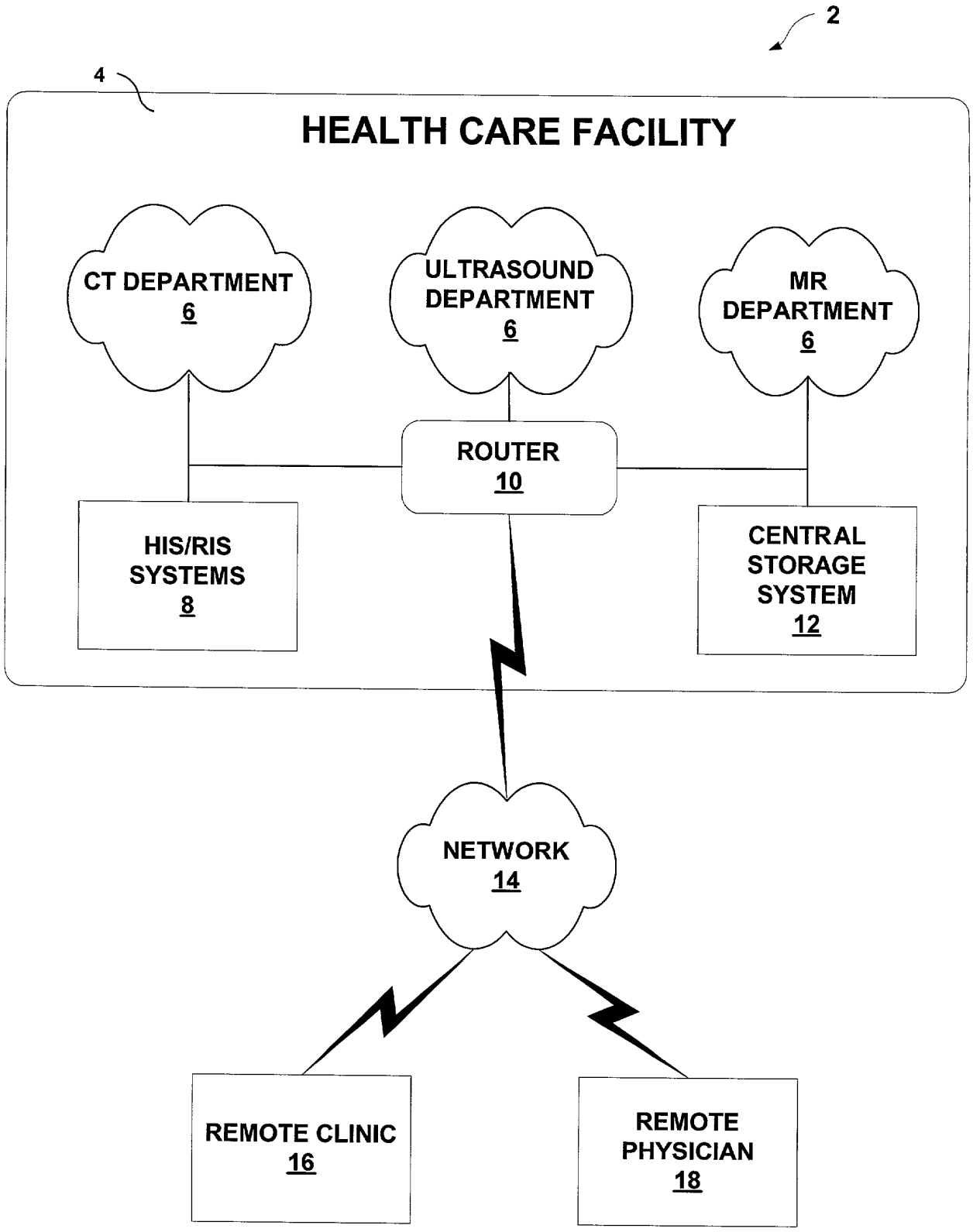
2
4
HEALTH CARE FACILITY
CT DEPARTMENT
6
ULTRASOUND
DEPARTMENT
6
MR
DEPARTMENT
6
ROUTER
10
HIS/RIS
SYSTEMS
8
CENTRAL
STORAGE
SYSTEM
12
NETWORK
14
REMOTE CLINIC
16
REMOTE
PHYSICIAN
18

FIG. 1

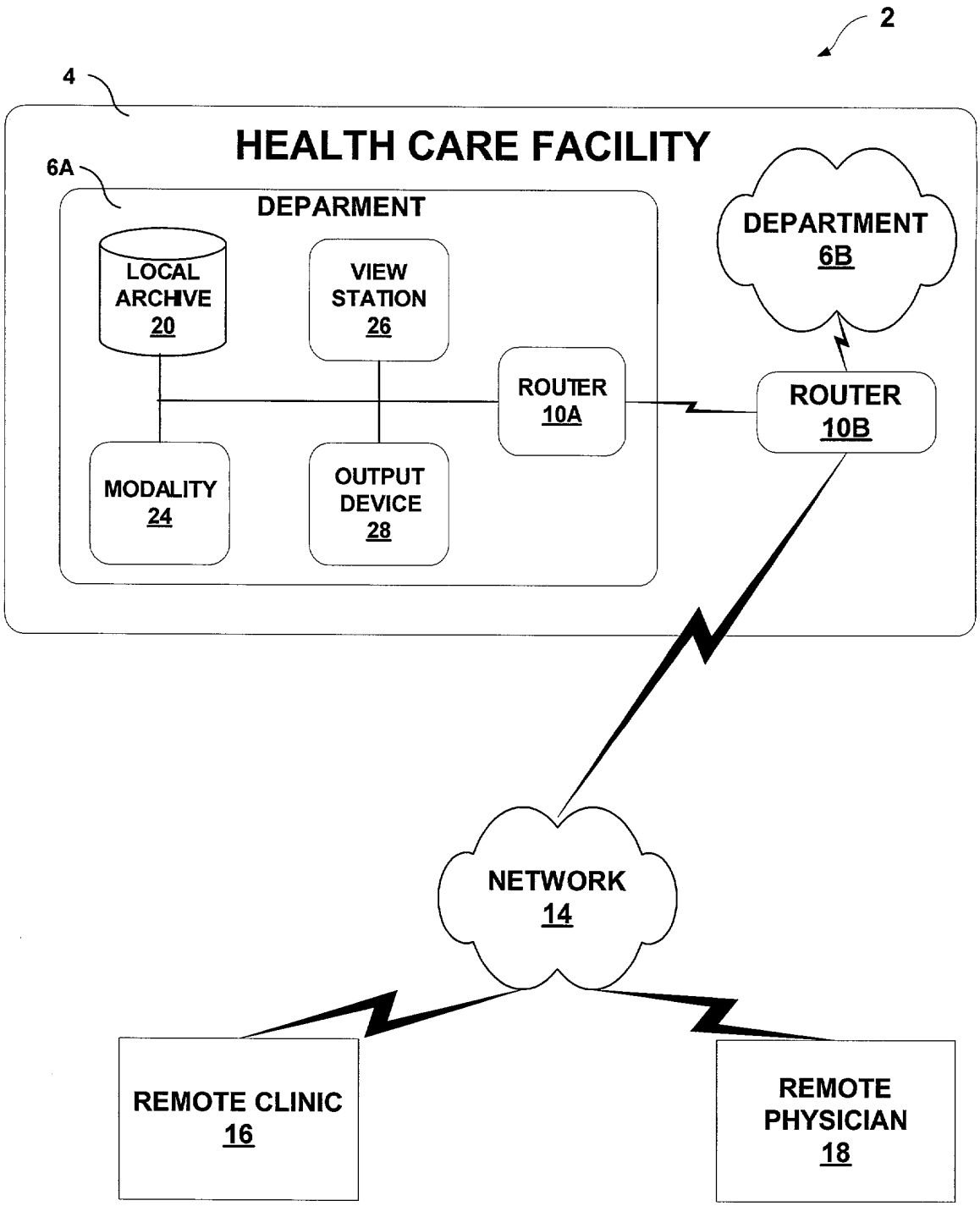
2
4
HEALTH CARE FACILITY
6A
DEPARMENT
LOCAL ARCHIVE 20
VIEW STATION 26
ROUTER 10A
MODALITY 24
OUTPUT DEVICE 28
DEPARTMENT 6B
ROUTER 10B
NETWORK 14
REMOTE CLINIC 16
REMOTE PHYSICIAN 18

FIG. 2

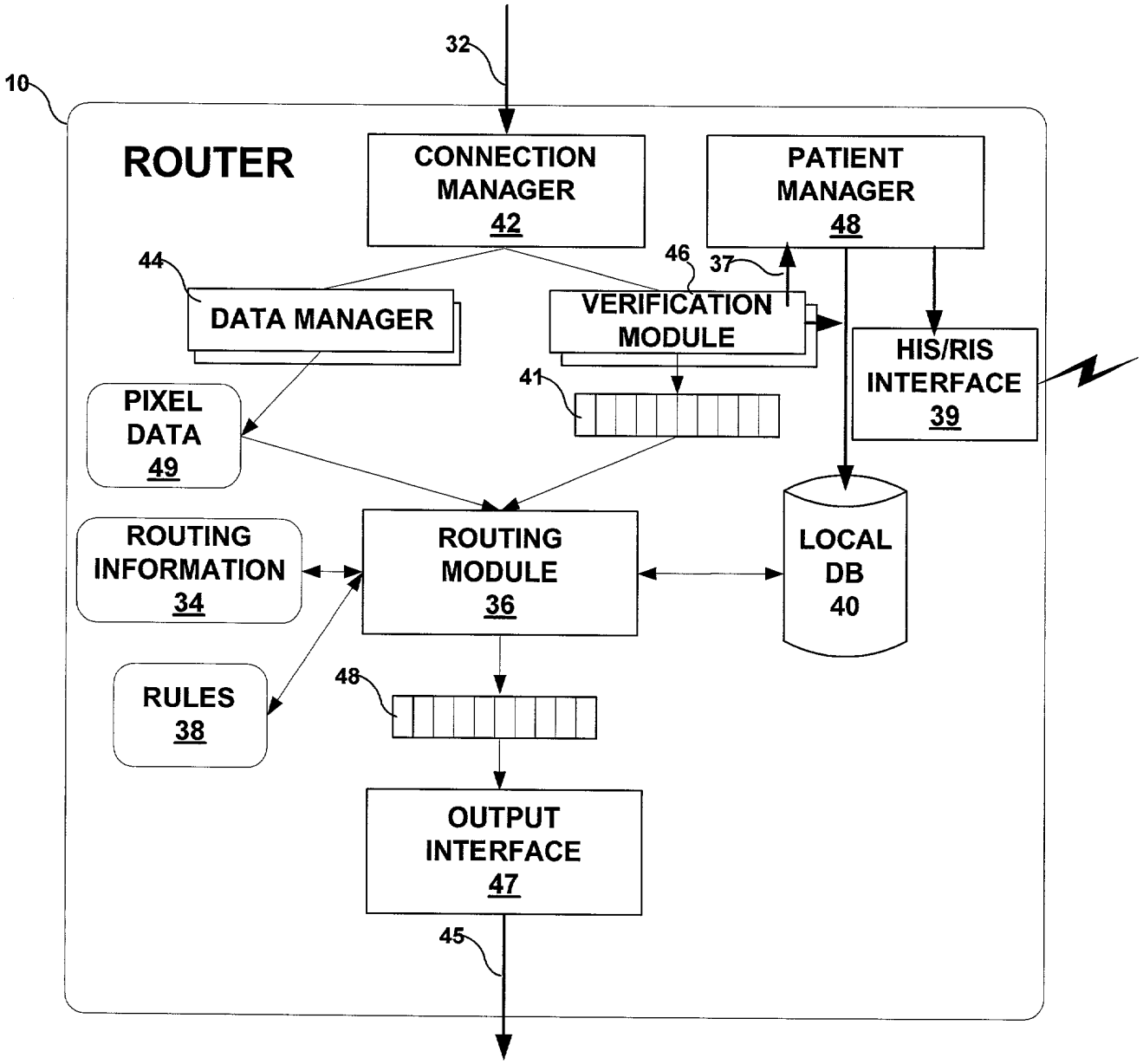
32
10
ROUTER
CONNECTION MANAGER 42
PATIENT MANAGER 48
44
DATA MANAGER
46
37
VERIFICATION MODULE
HIS/RIS INTERFACE 39
41
PIXEL DATA 49
ROUTING INFORMATION 34
ROUTING MODULE 36
LOCAL DB 40
RULES 38
48
OUTPUT INTERFACE 47
45

FIG.3

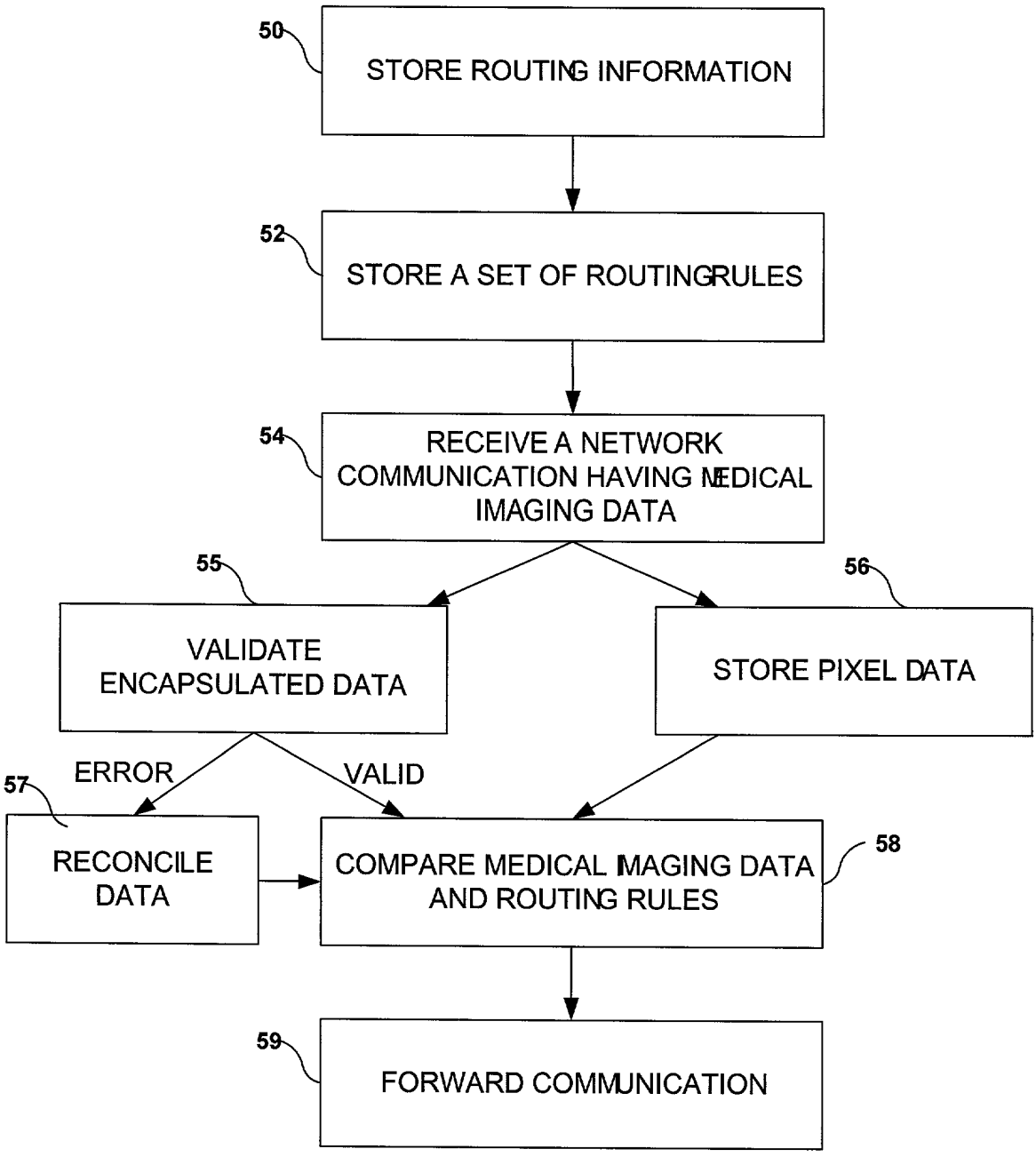
50
STORE ROUTING INFORMATION
52
STORE A SET OF ROUTING RULES
54
RECEIVE A NETWORK COMMUNICATION HAVING MEDICAL IMAGING DATA
55
VALIDATE ENCAPSULATED DATA
56
STORE PIXEL DATA
ERROR
VALID
57
RECONCILE DATA
COMPARE MEDICAL IMAGING DATA AND ROUTING RULES
58
59
FORWARD COMMUNICATION

FIG. 4

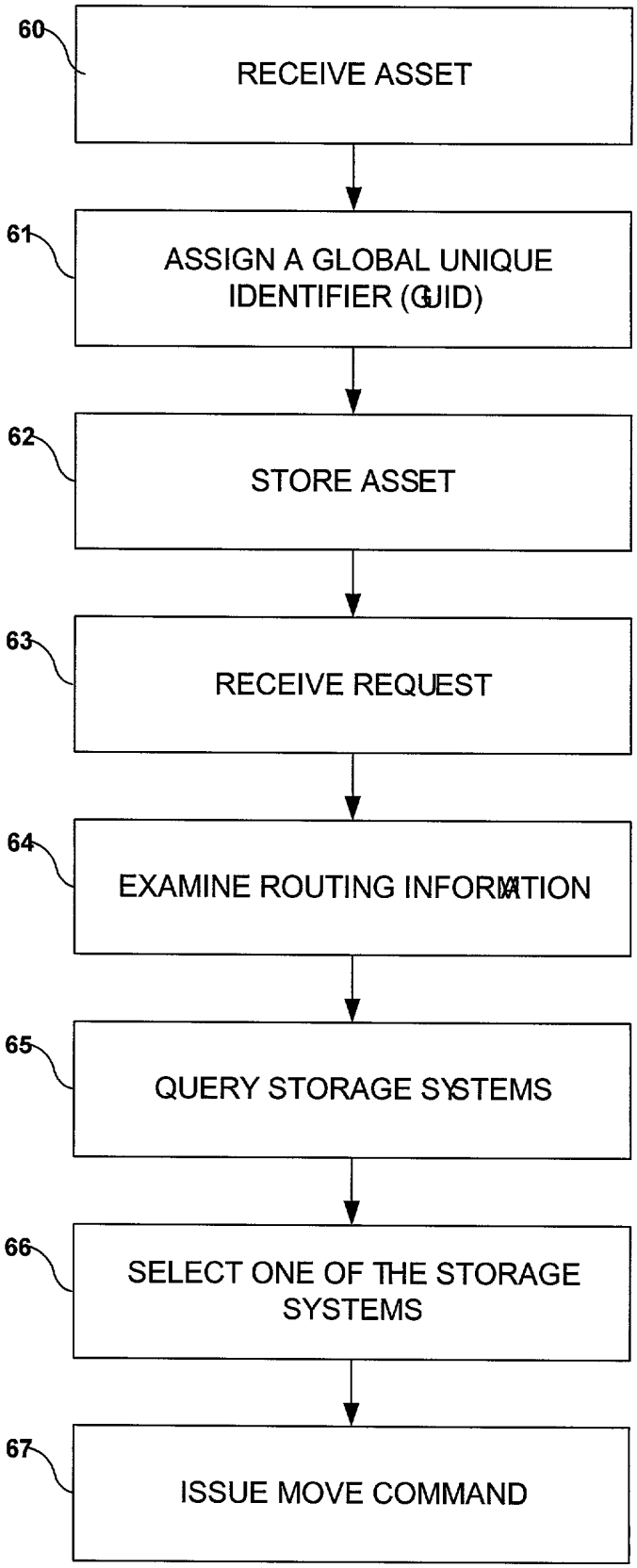
60
RECEIVE ASSET
61
ASSIGN A GLOBAL UNIQUE IDENTIFIER (GUID)
62
STORE ASSET
63
RECEIVE REQUEST
64
EXAMINE ROUTING INFORMATION
65
QUERY STORAGE SYSTEMS
66
SELECT ONE OF THE STORAGE SYSTEMS
67
ISSUE MOVE COMMAND

FIG. 5

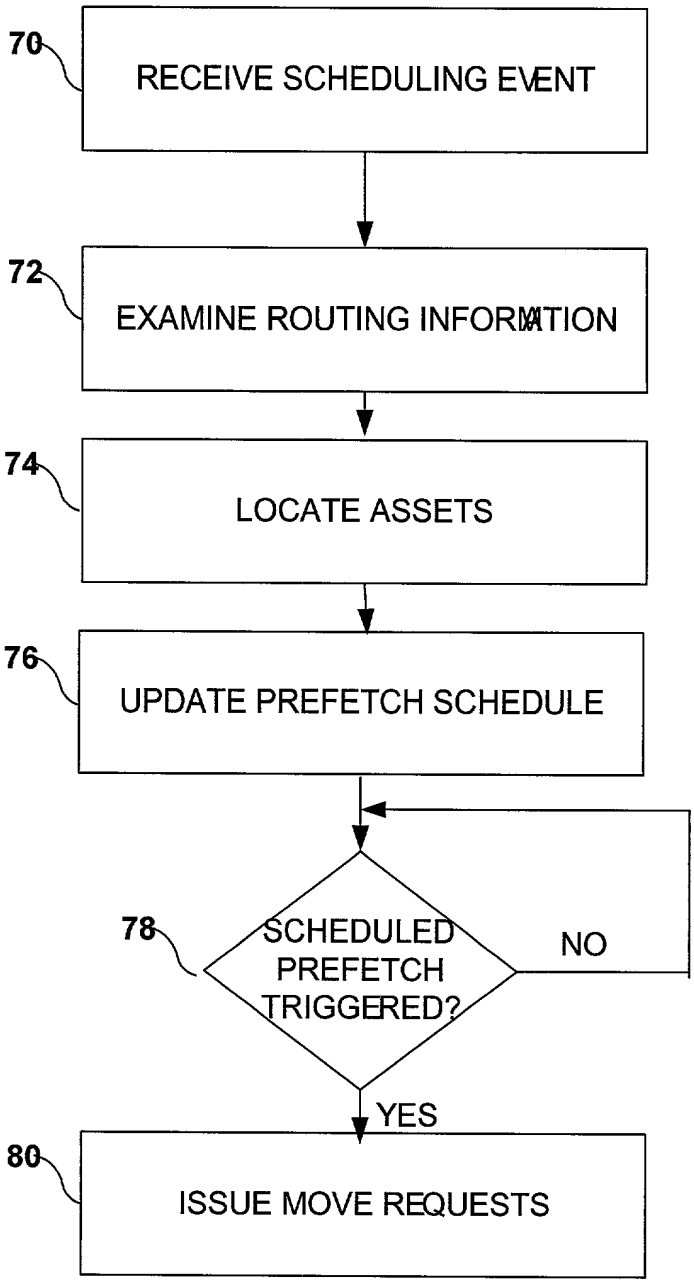
70
RECEIVE SCHEDULING EVENT
72
EXAMINE ROUTING INFORMATION
74
LOCATE ASSETS
76
UPDATE PREFETCH SCHEDULE
78
SCHEDULED PREFETCH TRIGGERED?
NO
YES
80
ISSUE MOVE REQUESTS

FIG. 6

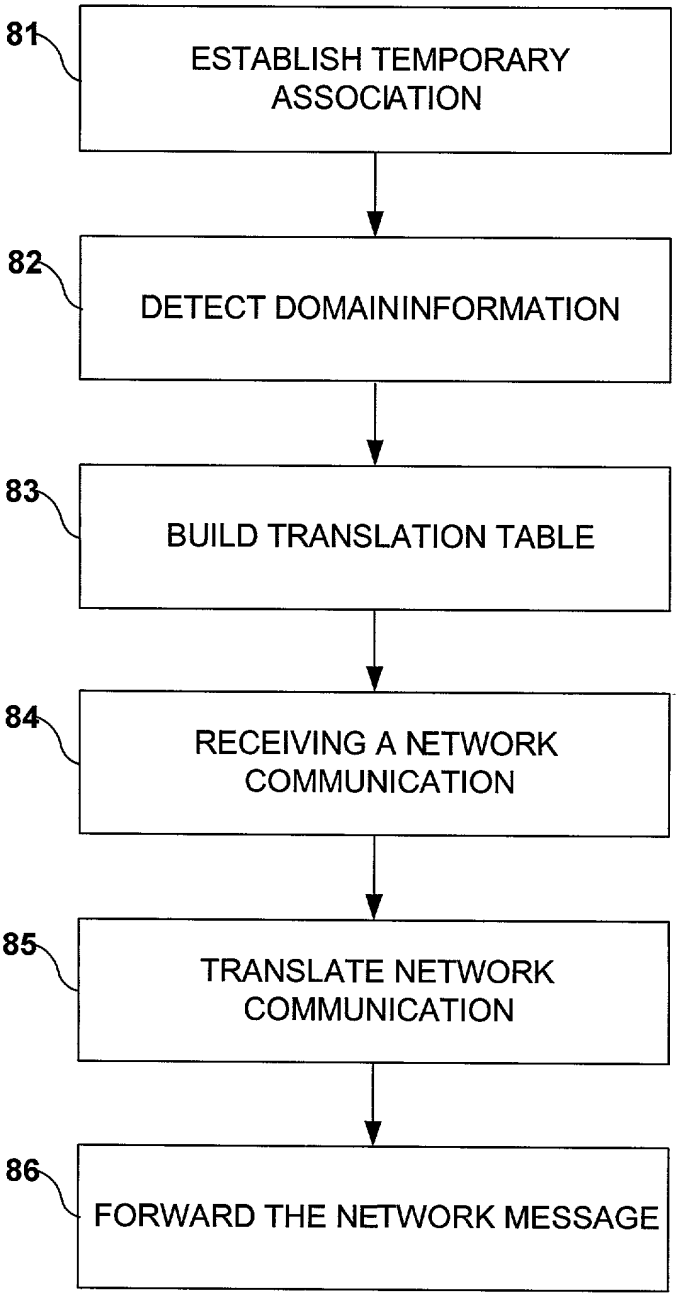
81
ESTABLISH TEMPORARY ASSOCIATION
82
DETECT DOMAININFORMATION
83
BUILD TRANSLATION TABLE
84
RECEIVING A NETWORK COMMUNICATION
85
TRANSLATE NETWORK COMMUNICATION
86
FORWARD THE NETWORK MESSAGE

FIG. 7

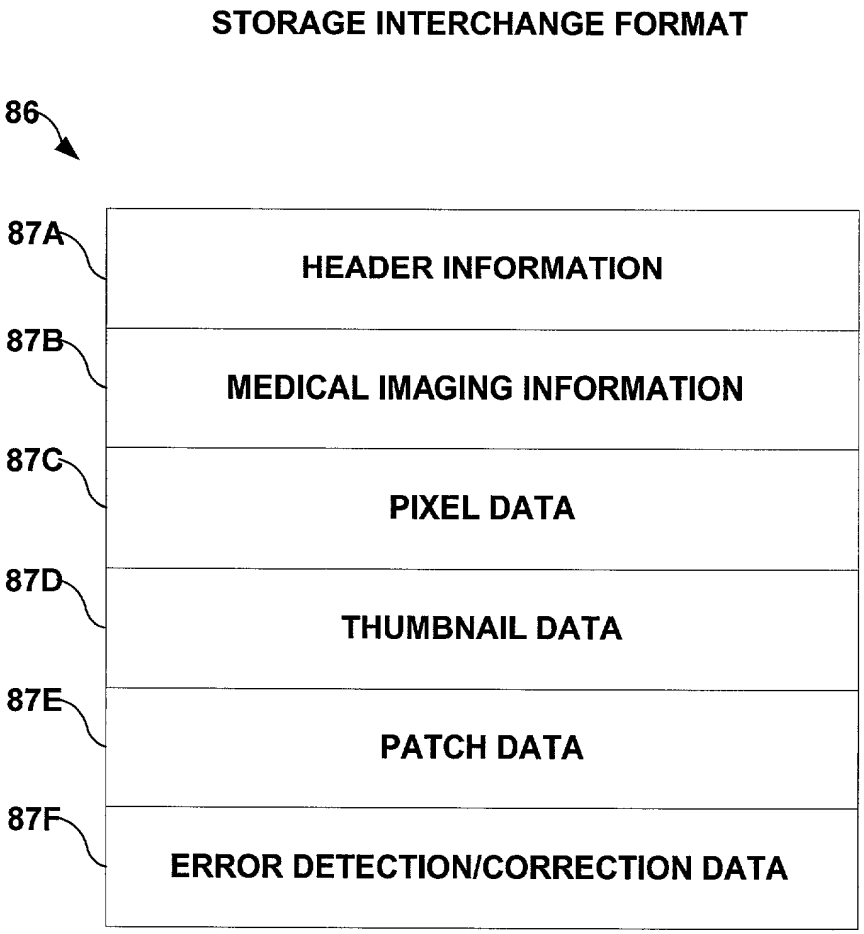
STORAGE INTERCHANGE FORMAT
86
87A
HEADER INFORMATION
87B
MEDICAL IMAGING INFORMATION
87C
PIXEL DATA
87D
THUMBNAIL DATA
87E
PATCH DATA
87F
ERROR DETECTION/CORRECTION DATA

FIG. 8

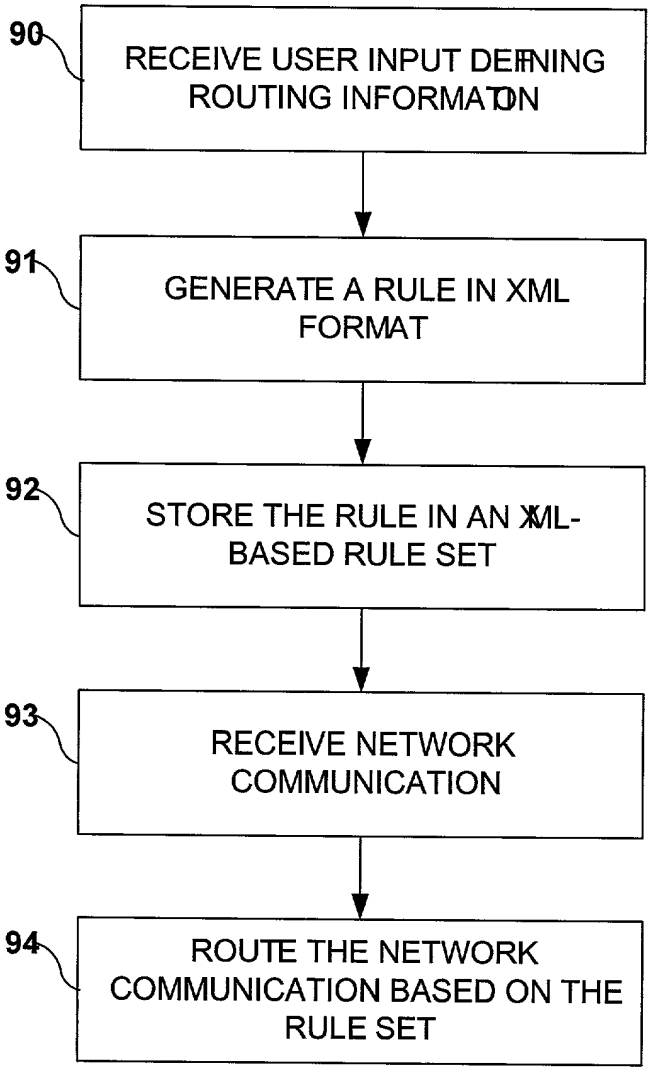
90
RECEIVE USER INPUT DEFINING ROUTING INFORMATION
91
GENERATE A RULE IN XML FORMAT
92
STORE THE RULE IN AN XML-BASED RULE SET
93
RECEIVE NETWORK COMMUNICATION
94
ROUTE THE NETWORK COMMUNICATION BASED ON THE RULE SET

FIG. 9

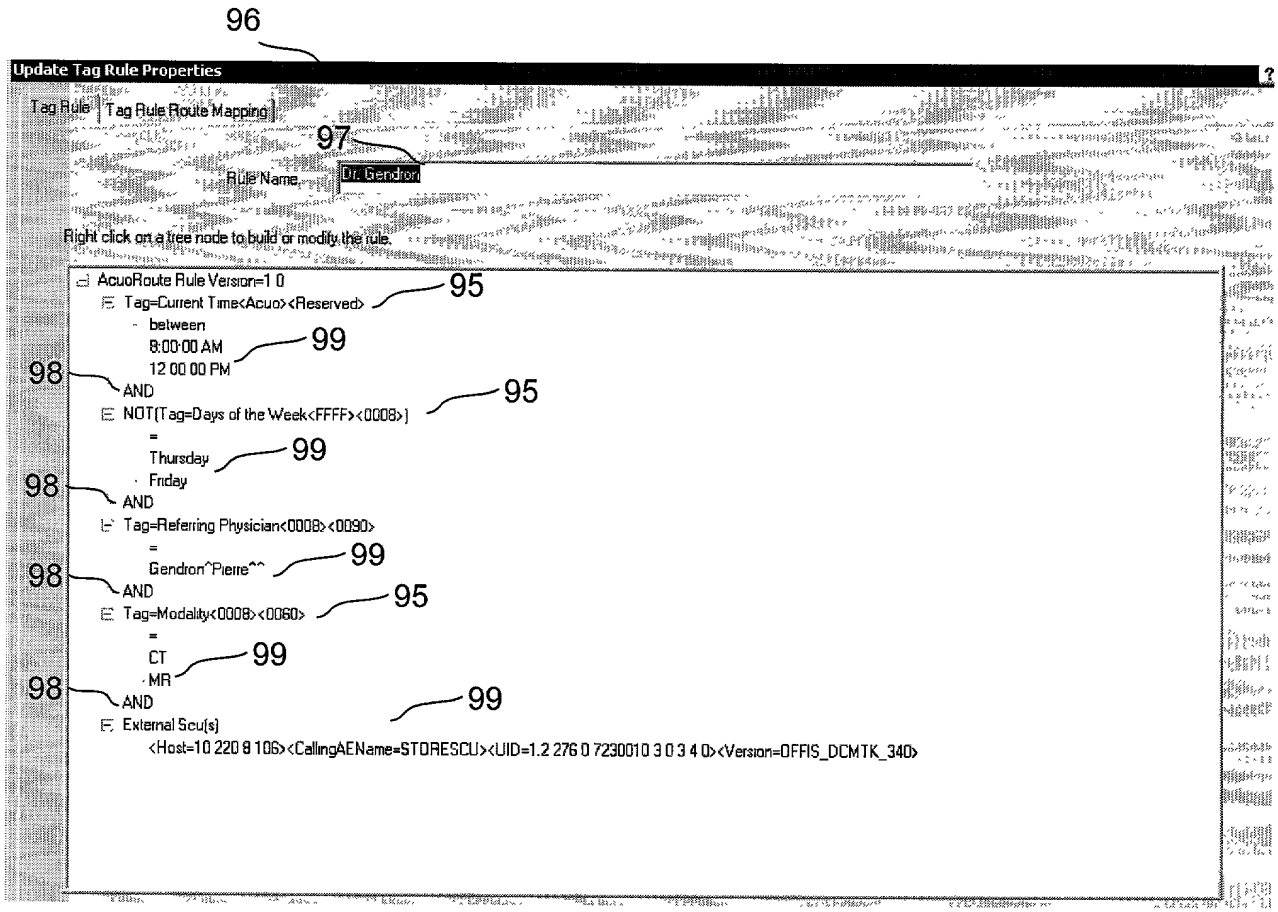
96
Update Tag Rule Properties
Tag Rule
Tag Rule Route Mapping
97
Rule Name
Dr. Gendron
Right click on a tree node to build or modify the rule.
AcuoRoute Rule Version=1 0
Tag=Current Time<Acuo><Reserved>
95
between
8:00:00 AM
99
12 00 00 PM
98
AND
NOT(Tag=Days of the Week<FFFF><0008>)
95
=
Thursday
99
Friday
98
AND
Tag=Referring Physician<0008><0090>
=
Gendron^Pierre^^
99
98
AND
Tag=Modality<0008><0060>
95
=
CT
99
MR
98
AND
99
External Scu[s]
<Host=10 220 8 106><CallingAEName=STORESCU><UID=1.2 276 0 7230010 3 0 3 4 0><Version=OFFIS_DCMTK_340>

FIG. 10

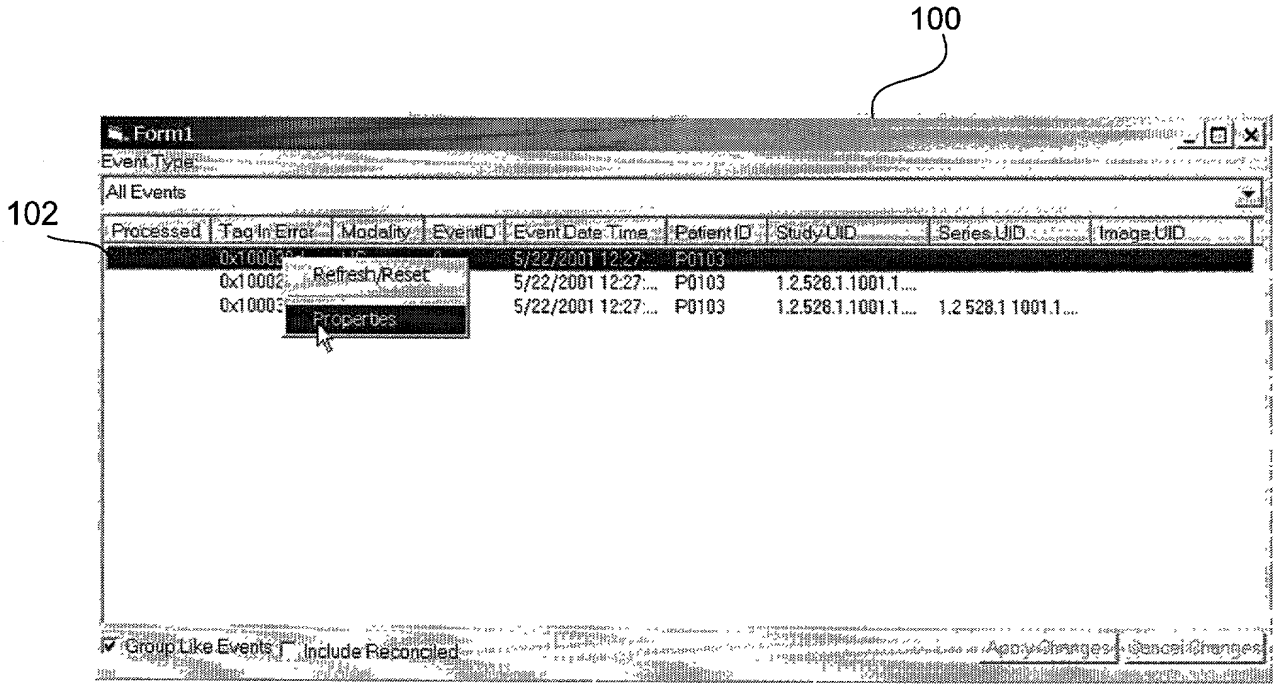
100
102
Form1
Event Type:
All Events
Processed
Tag In Error
Modality
EventID
Event Date Time
Patient ID
Study UID
Series UID
Image UID
0x10000
0x10002
0x10003
Refresh/Reset
Properties
5/22/2001 12:27:...
P0103
1.2.528.1.1001.1....
1.2.528.1.1001.1....
1.2.528.1.1001.1...
Group Like Events
Include Reconciled
Apply Changes
Cancel Changes

FIG. 11

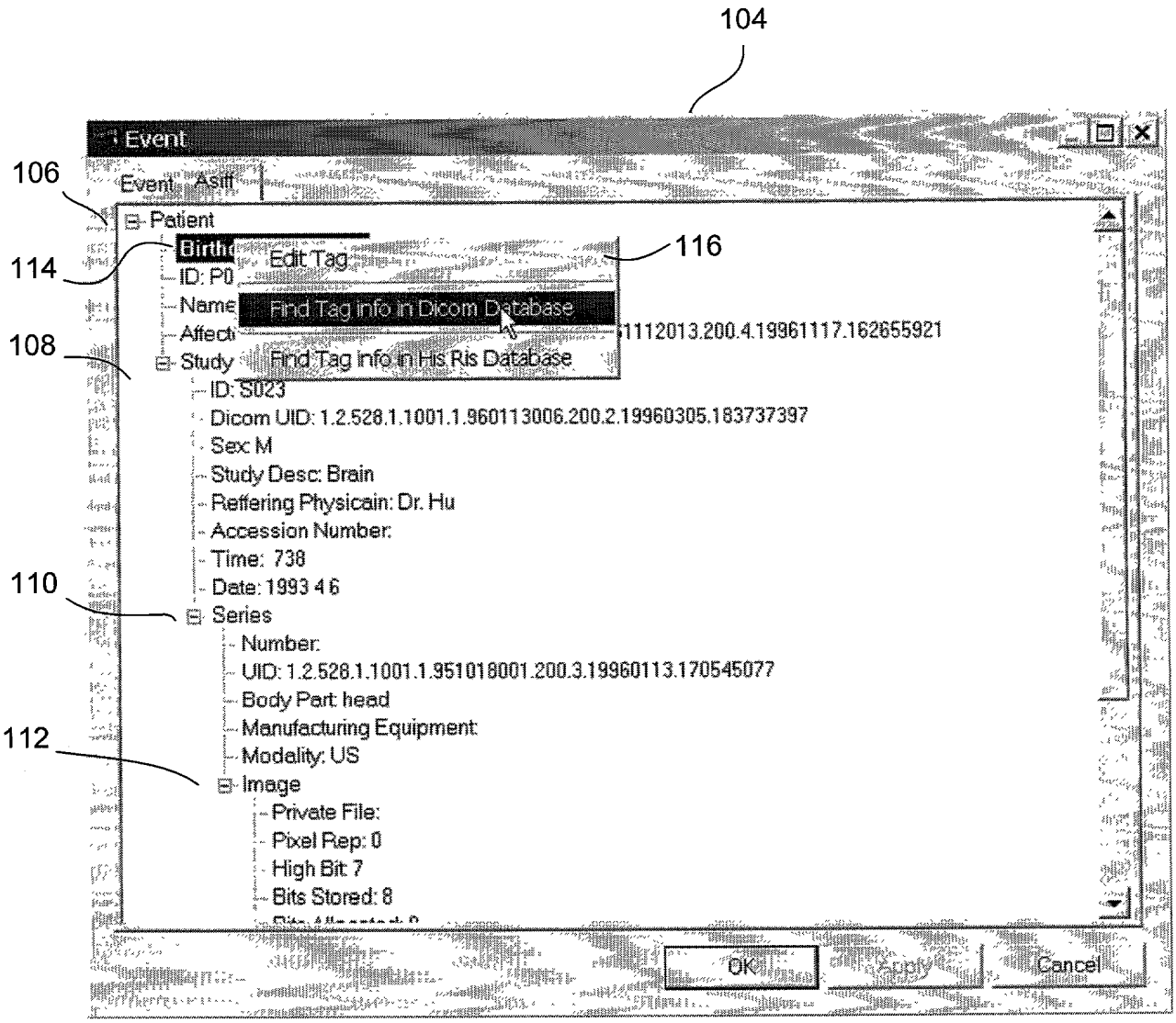
104
106
114
116
108
110
112
Event
Event Asiff
Patient
Birth
Edit Tag
ID: P0
Name
Find Tag info in Dicom Database
Affecti
1112013.200.4.19961117.162655921
Study
Find Tag info in His Ris Database
ID: S023
Dicom UID: 1.2.528.1.1001.1.960113006.200.2.19960305.183737397
Sex: M
Study Desc: Brain
Reffering Physicain: Dr. Hu
Accession Number:
Time: 738
Date: 1993 4 6
Series
Number:
UID: 1.2.528.1.1001.1.951018001.200.3.19960113.170545077
Body Part: head
Manufacturing Equipment:
Modality: US
Image
Private File:
Pixel Rep: 0
High Bit: 7
Bits Stored: 8
OK
Apply
Cancel

FIG. 12

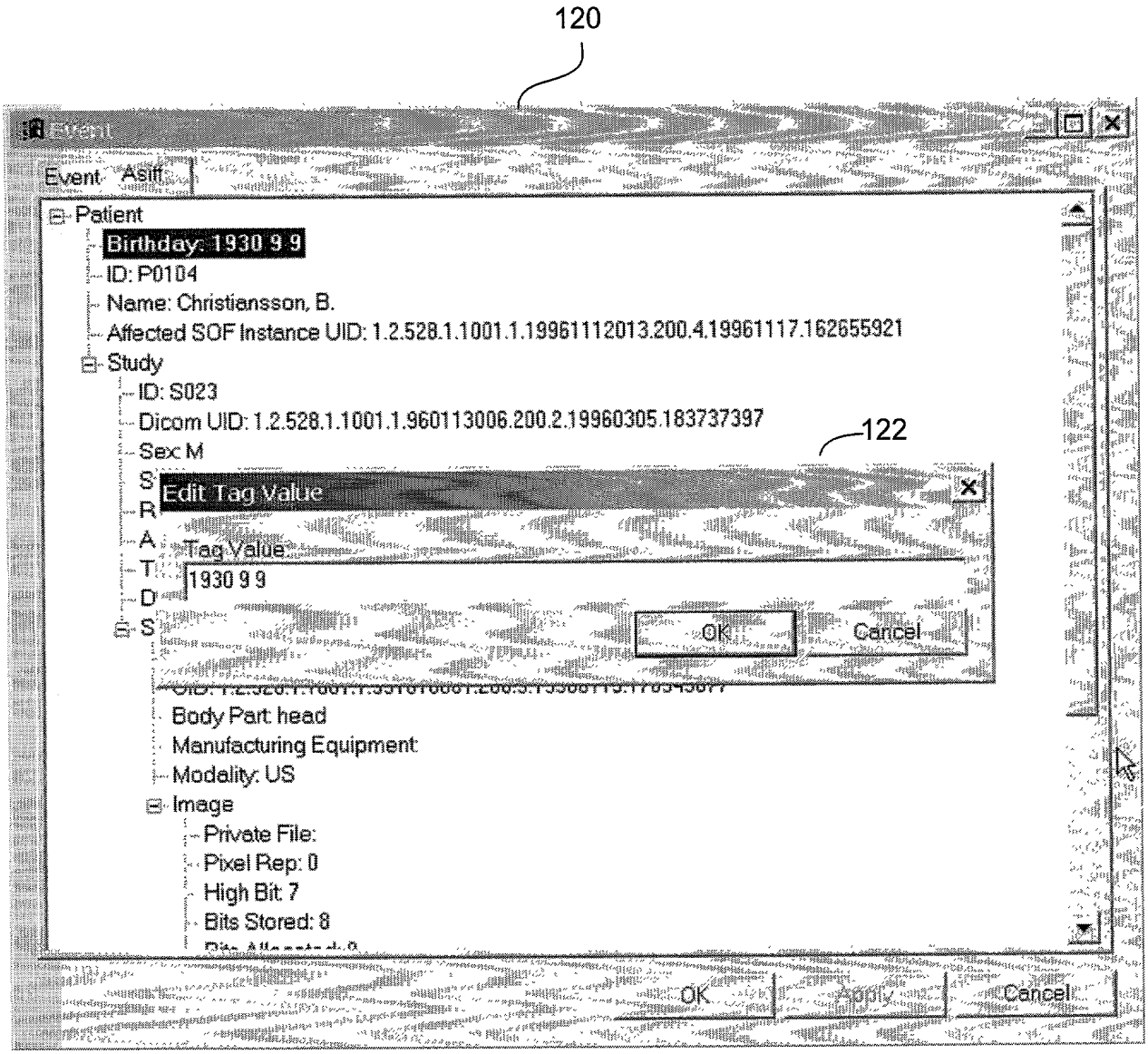
120
Event
Event Asiff
Patient
Birthday: 1930 9 9
ID: P0104
Name: Christiansson, B.
Affected SOF Instance UID: 1.2.528.1.1001.1.19961112013.200.4.19961117.162655921
Study
ID: S023
Dicom UID: 1.2.528.1.1001.1.960113006.200.2.19960305.183737397
Sex: M
122
Edit Tag Value
Tag Value:
1930 9 9
OK
Cancel
Body Part: head
Manufacturing Equipment:
Modality: US
Image
Private File:
Pixel Rep: 0
High Bit: 7
Bits Stored: 8
OK
Apply
Cancel

FIG. 13

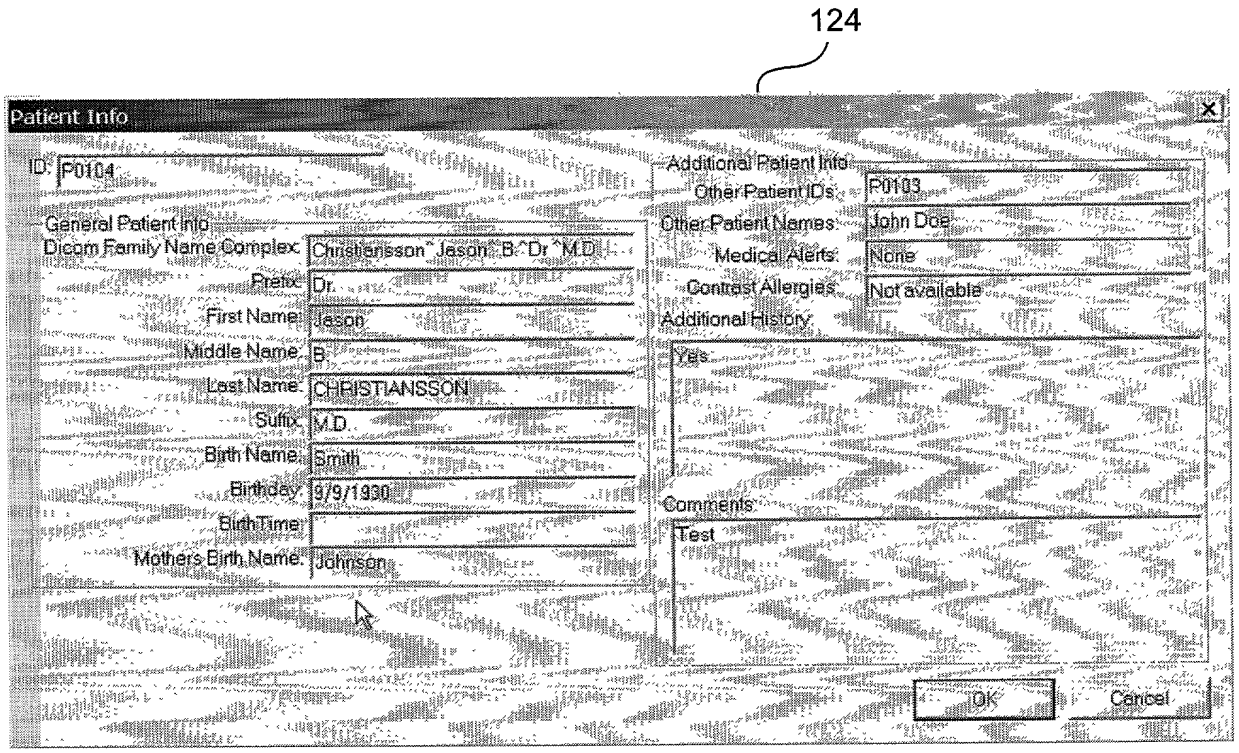
124
Patient Info
ID: P0104
General Patient Info
Dicom Family Name Complex: Christiansson^Jason^B^Dr^M.D.
Prefix: Dr.
First Name: Jason
Middle Name: B
Last Name: CHRISTIANSSON
Suffix: M.D.
Birth Name: Smith
Birthday: 9/9/1930
Birth Time:
Mother's Birth Name: Johnson
Additional Patient Info
Other Patient IDs: P0103
Other Patient Names: John Doe
Medical Alerts: None
Contrast Allergies: Not available
Additional History:
Yes
Comments:
Test
OK
Cancel

FIG. 14

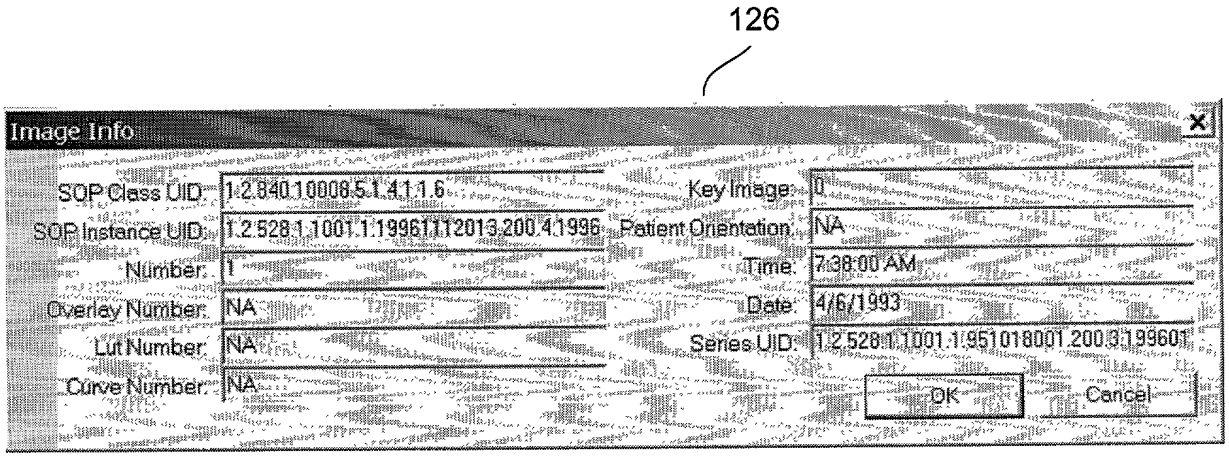
126
Image Info
SOP Class UID:
1.2.840.10008.5.1.4.1.1.6
SOP Instance UID:
1.2.528.1.1001.1.19961112013.200.4.1996
Number:
1
Overlay Number:
NA
Lut Number:
NA
Curve Number:
NA
Key Image:
0
Patient Orientation:
NA
Time:
7:38:00 AM
Date:
4/6/1993
Series UID:
1.2.528.1.1001.1.951018001.200.3.199601
OK
Cancel

FIG. 15

Appl. No. 10/774,054
Amdt. dated June 4, 2008
Reply to Office Action of March 4, 2008

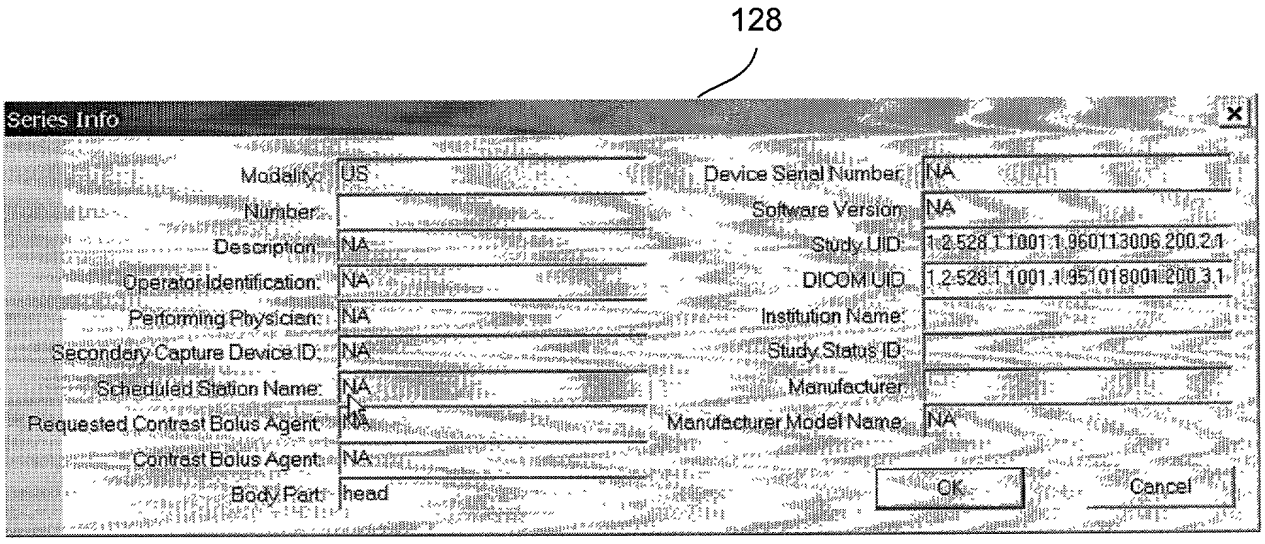

FIG. 16

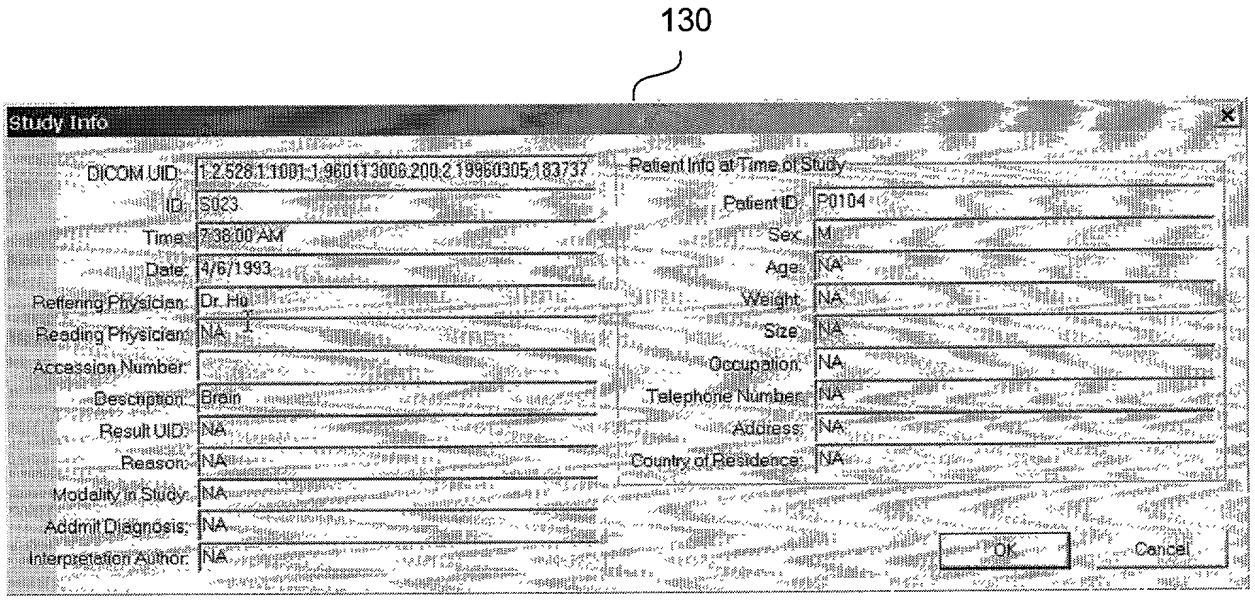
130
Study Info
DICOM UID: 1.2.528.1.1001.1.96011 3008.200.2.19960305.183737
ID: S023
Time: 7:38:00 AM
Date: 4/6/1993
Referring Physician: Dr. Hu
Reading Physician: NA
Accession Number:
Description: Brain
Result UID: NA
Reason: NA
Modality In Study: NA
Admit Diagnosis: NA
Interpretation Author: NA
Patient Info at Time of Study
Patient ID: P0104
Sex: M
Age: NA
Weight: NA
Size: NA
Occupation: NA
Telephone Number: NA
Address: NA
Country of Residence: NA
OK
Cancel

FIG. 17

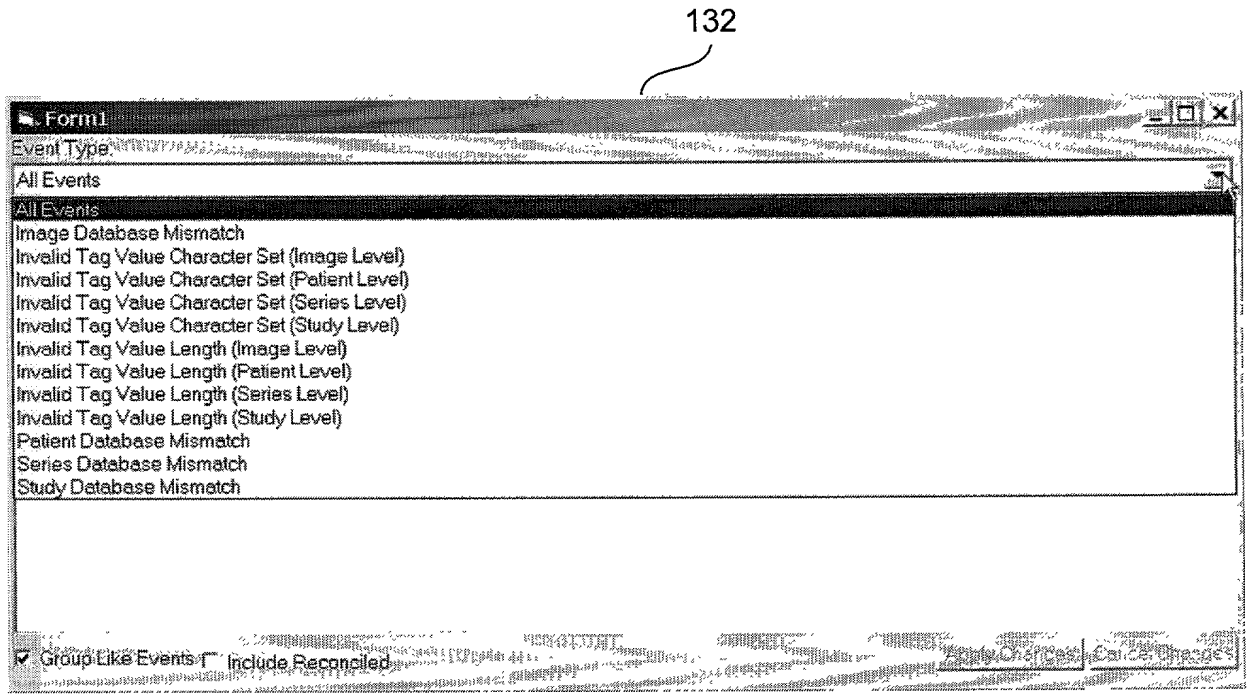
132
Form1
Event Type
All Events
All Events
Image Database Mismatch
Invalid Tag Value Character Set (Image Level)
Invalid Tag Value Character Set (Patient Level)
Invalid Tag Value Character Set (Series Level)
Invalid Tag Value Character Set (Study Level)
Invalid Tag Value Length (Image Level)
Invalid Tag Value Length (Patient Level)
Invalid Tag Value Length (Series Level)
Invalid Tag Value Length (Study Level)
Patient Database Mismatch
Series Database Mismatch
Study Database Mismatch
Group Like Events
Include Reconciled
Apply Changes
Cancel Changes

FIG. 18

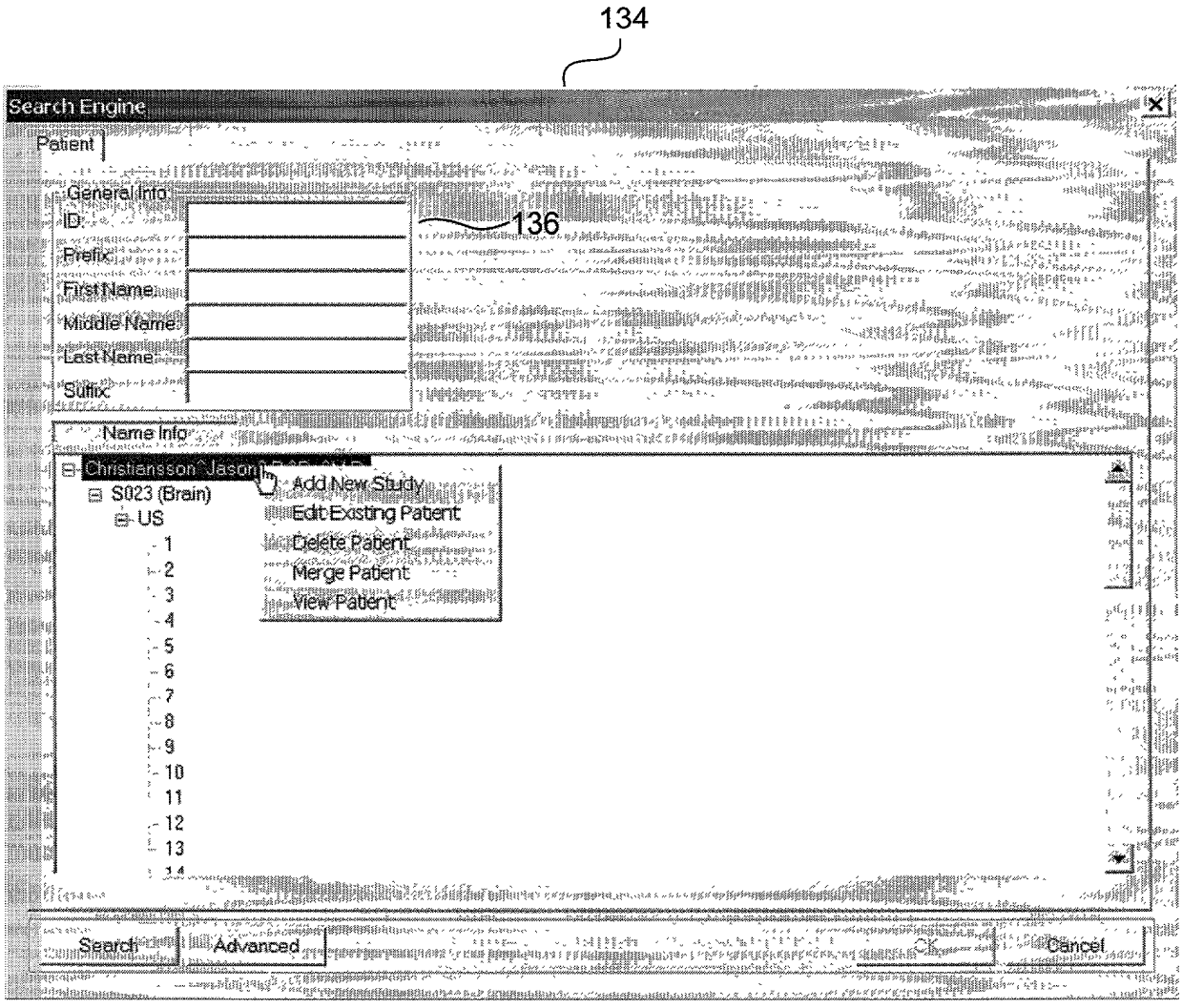
134
Search Engine
Patient
General Info
ID:
Prefix:
First Name:
Middle Name:
Last Name:
Suffix:
136
Name Info
Christiansson^Jason
S023 (Brain)
US
1
2
3
4
5
6
7
8
9
10
11
12
13
Add New Study
Edit Existing Patient
Delete Patient
Merge Patient
View Patient
Search
Advanced
Cancel

FIG. 19

138

```
08002000                          (0008,0020): Study Date.  Decimal Tag: (0008,0032)
08000000                          Tag Length: 8
3139393431323236                  Tag Data: 19941226

08003000                          (0008,0030): Study Time.  Decimal Tag: (0008,0048)
0c000000                          Tag Length: 12
3030303030302e3030303020          Tag Data: 000000.0000

08006000                          (0008,0060): Modality.  Decimal Tag: (0008,0096)
02000000                          Tag Length: 2
4d52                              Tag Data: MR

08007000                          (0008,0070): Manufacturer.  Decimal Tag: (0008,0112)
18000000                          Tag Length: 24
5068696c697073204d65646963616c20  Tag Data: Philips Medical
53797374656d7320                  Tag Data: Systems

08008000                          (0008,0080): Institution Name.  Decimal Tag:
(0008,0128)
10000000                          Tag Length: 16
444f4149204d454d4f5249414c204850  Tag Data: DOAI MEMORIAL HP

08003010                          (0008,1030): Study Description.  Decimal Tag:
(0008,4144)
08000000                          Tag Length: 8
432d5350494e4520                  Tag Data: C-SPINE


10001000                          (0010,0010): Patient's Name.  Decimal Tag: (0016,0016)
12000000                          Tag Length: 18
4d522f43205350494e452f5453452f32  Tag Data: MR/C SPINE/TSE/2
3536                              Tag Data: 56

10003000                          (0010,0030): Patient's Birth Date.  Decimal Tag:
(0016,0048)
08000000                          Tag Length: 8
3139363430373331                  Tag Data: 19640731

10004000                          (0010,0040): Patient's Sex.  Decimal Tag: (0016,0064)
02000000                          Tag Length: 2
4d20                              Tag Data: M
```

FIG. 20